State of the art of thermoelectric generators for waste heat recovery applications

Abstract

Thermoelectric generators cover a broad range of power outputs, from nanowatts to kilowatts, they have demonstrated unique characteristics compared to other energy conversion systems; such as long life, the absence of moving parts and emissions, low maintenance and high reliability. Waste heat represents a radical obstruction countering efficiency improvements of almost all types of energy conversion systems. The employment of thermoelectric generators in waste heat recovery applications was motivated by the advances in thermoelectric materials and manufacturing. This paper sheds the light on the state of the art of thermoelectric generators for different waste heat recovery applications. The introduction of this paper explains the fundamentals of thermoelectric molecular phenomena. The second section highlights some recent developments in thermoelectric materials. Construction of thermoelectric generators for automobile waste heat recovery is discussed in the third section. Finally, some thermoelectric waste heat recovery systems for power plants and industrial applications are elucidated.